Productivity Perspectives

1985 Edition

AMERICAN PRODUCTIVITY CENTER

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Productivity Perspectives

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Introduction

The Recovery: Promise or Peril

The U.S. is now well accustomed to thinking of 1983 as a recovery year. And 1984 spawned countless articles proclaiming that solutions to the productivity problems of the '70s and early '80s are within reach. It is true that factors contributing to some of the sagging performance statistics have in fact been "solved." For example, a second work force infusion of women and young people comparable to that of the last decade is not likely to be an issue in the 1980s. That earlier influx of inexperienced and often unskilled workers put extraordinary strains on the nation's business and industry, and in retrospect it is remarkable that the economy slowed no more than it did to accommodate these new entrants to the labor force.

The U.S. is now better able to handle shifts in energy availability and policy. Also promising is the increased recognition of the importance of capital formation, and investments in R&D innovation are now in every politician's speeches. Likewise, employee involvement and productivity planning are part of the strategy of an increasing number of organizations.

But even as the old problems are being solved, new problems are arising that will not be solved for awhile. The huge federal deficit looms over most aspects of economic analysis, and its unprecedented size leads automatically to unprecedented uncertainty among economists as to its potential effect. The U.S. dollar's strength, in spite of less than strong performance in some areas of the U.S. domestic economy, is severely impacting the U.S. trade balance and taking some industries out of the world market. And the U.S. banking system, previously preoccupied with placing massive oil-state surpluses, now must worry about the solvency of the mainly Latin American countries in which the flows have been placed.

Compounding these domestic concerns is the increasing competition for world markets. No longer can U.S. companies rely upon improvement in the domestic business cycle alone to ensure their financial well-being. As the analysis in the 1985 edition of Productivity Perspectives demonstrates, global competition now requires continuous attention to productivity and quality improvement.

U.S. Productivity in the 1980s

The United States showed a good productivity recovery in 1983 from the recession of the previous year, and this improvement continued in the first half of 1984 (Figure 1). However, taking a longer-term view, this performance of the U.S. economy is about "average" — encouraging but not enough. Productivity growth during the 1979-1983 period averaged out slightly better than the 1973-1979 period, but that was entirely due to a strong 1983 performance.

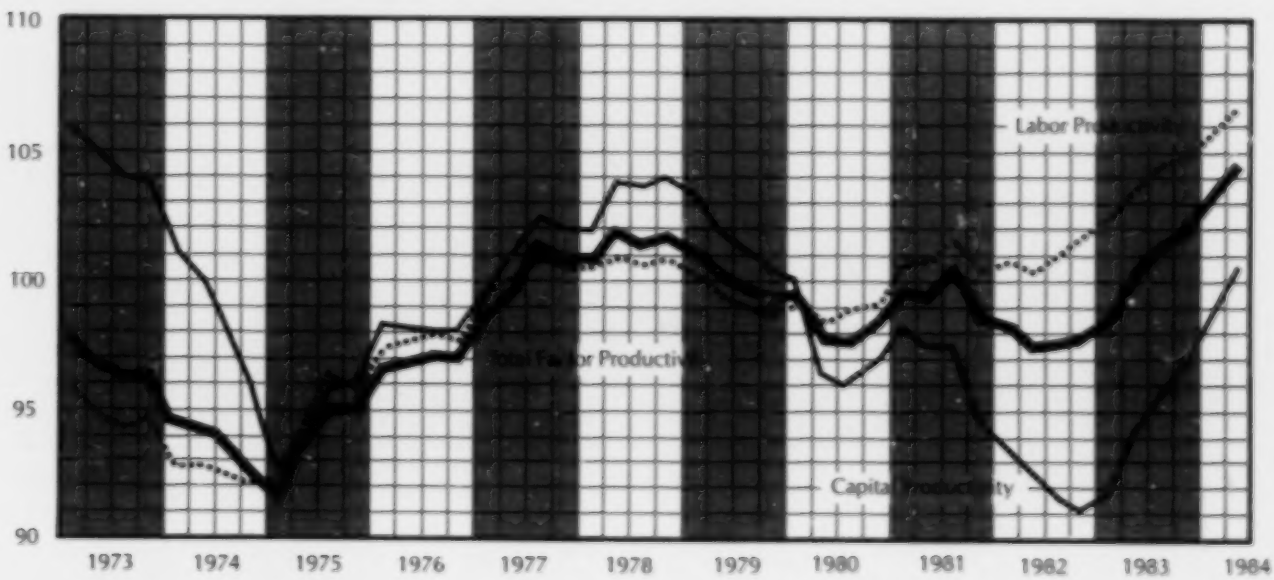
Performance Variations

To generalize about the U.S. economy is difficult; the economy is really a collection of interrelated sub-economies focusing on different *industry groups* (Figure 2). Many parts of the economy performed substantially better in the 1979-1983 period than the 1.1 percent average improvement of the business economy as a whole. Notable are the communications industry with a gain of 4.6 percent per year, and the 2.4 percent of manufacturing. Many key industries (real estate, construction, transportation, utilities, mining) showed negative performance during this period.

Figure 2
Labor Productivity (Average Annual Growth Rates)

Source: American Productivity Center

Figure 1
Productivity Trends in the U.S. Business Economy by Quarter —1973-84



Source: American Productivity Center

The natural emphasis of many economists is on the manufacturing sector because its cyclical behavior is both the driving force and the result of many interesting interrelations. But to understand the poor performance of the U.S. economy requires a look at the other sectors as well — those referred to as "non-farm/non-manufacturing" (Figure 3). While *manufacturing* labor productivity increased 12.8 percent between 1978 II and 1983 III (or an average of 2.4 percent per year), the *non-farm/non-manufacturing* sector made exactly *zero net* progress.

Each industry has its own story. In some of the service industries, transportation being an example, deregulation or a sudden strategic shift may be at the root of the current declines. In such cases, the impact on productivity, while highly disruptive in the short run, may prove to be positive in the longer term.

Capital Productivity

To more fully understand the economy's productivity performance, it is important to view other factors beyond labor productivity. When examined in terms of *capital productivity*, the economy was *significantly* weaker in the 1979-83 period than from 1973-79 despite good performance in 1983 (Figure 4). Only three segments, farming, communications and miscellaneous business services, registered even slightly positive capital productivity improvement for this period. Business services, the only segment to increase meaningfully, had a five percent annual increase in output to offset a three percent annual increase in capital stock. Performance ranged down to a low of -8.1 percent per year performance in finance and insurance.

Figure 3
Labor Productivity — Sector Comparisons

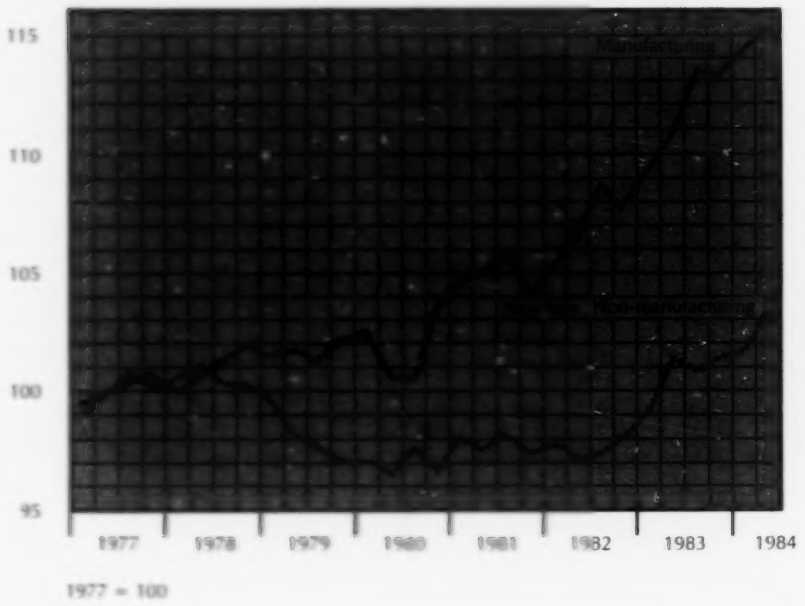


Figure 4
Capital Productivity (Average Annual Growth Rates)

Source: American Productivity Center

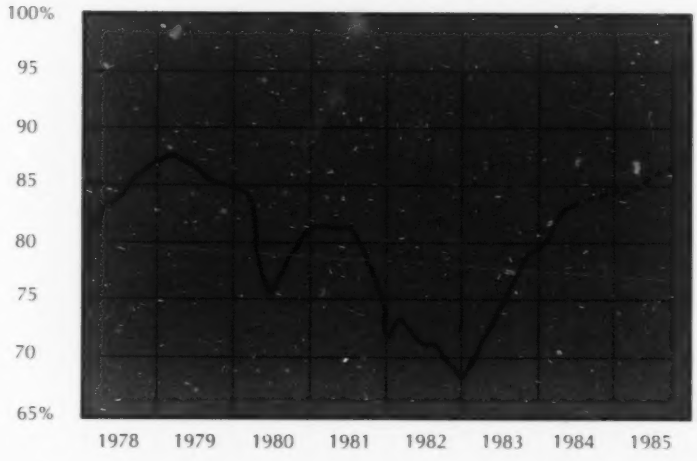
Capacity utilization increased so greatly in 1983 that an increase in capital productivity was to be expected (Figure 5). Increases continued in early 1984, but by mid-1984 capacity utilization had reached 83 percent. It would be unreasonable to expect a capacity utilization level of more than the previous mid-'70s highs of 87-88 percent (Federal Reserve basis). One way of looking at this is that about two thirds of the improvement that could be expected had already occurred by the end of 1983, and about three fourths had occurred by mid-1984. So further productivity improvement will have to come from other than pure capacity utilization improvement.

It is interesting to note the shift in the nature of what is capital. Customarily, capital is thought of as machinery and equipment, but increasingly capital is found in places other than the factory. Figure 6 demonstrates that the amount of capital stock that is in computers or computer-related equipment has increased very substantially.

Total Factor Productivity

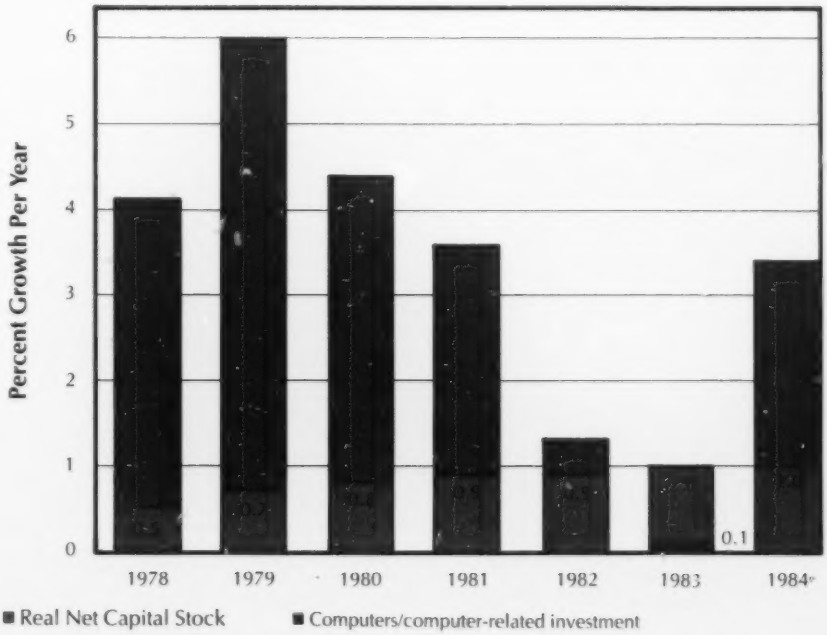
Total factor productivity statistics are shown in Figure 7. From a long term perspective, the below average performance of labor productivity, coupled with the even *more dismal* performance

Figure 5
Capacity Utilization — 1978-1985[e]



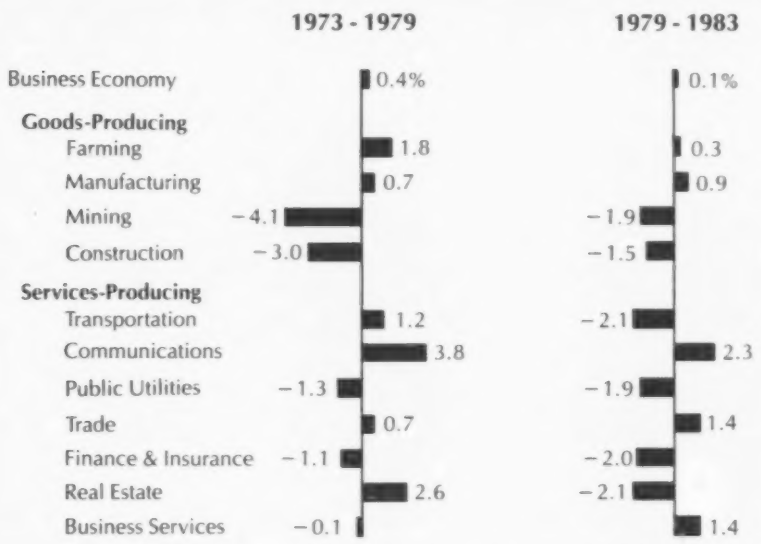
e = estimate by Goldman Sachs Economics
Source: Federal Reserve

Figure 6
Growth of Manufacturers Capital Stock
(Real Net Growth Rate - 1978-84[e])



e = estimate by Goldman Sachs Economics
Source: Bureau of Economic Analysis

Figure 7
Total Factor Productivity (Average Annual Growth Rates)



Source: American Productivity Center

Figure 8
Productivity Performance Compared to Previous Recoveries

	Labor Productivity Growth (annualized)
Six Quarters of Recovery	
1954II - 55III	3.3%
1958II - 59IV	2.9
1960IV - 62II	4.5
1970IV - 72II	4.1
1975I - 76III	4.1
1980II - 81IV	1.3
Average, six previous recoveries	**3.4**
1982IV - 84II	3.4

Source: American Productivity Center

of capital productivity, resulted in stagnant total factor performance during the last 10 years. But that sad story hides some real successes. Strong positive gains have been attained by the farming segment, although it has experienced a falloff in recent times. The communications industry presented the best overall performance. Electrical machinery, textiles, apparel, chemicals, food and instruments showed performance consistently better than the economy as a whole. Consistently negative performers included finance and insurance, primary metals, construction and mining. Public utilities and petroleum have gone from the "strongest" list to the "weak" list in the last 10 years.

Current Recovery

Increasingly there is a tendency to assume that the recent recovery signals an end to the productivity woes of the past decade. A close look at the data suggests that such optimism is not justified.

Looking at the first six quarters of each of the last seven recoveries demonstrates that the *current recovery* was about *average* through the second quarter of 1984 (Figure 8). Normally, there is nothing wrong with average, as long as observers recognize that average is not the same thing as outstanding.

Labor productivity *levels* offer no clear indication of consistently strong performance by either the goods or services producers (Figure 9). Some industries achieved growth from 1982 to 1983 by boosts in output, others by restraining labor input. Real estate, communications and public utilities showed substantially higher labor productivity than any other sectors. This is primarily a demonstration of inherent low labor intensity.

The largest positive movement in labor productivity from 1982 to 1983 was in rail transportation and was the result of a small decline in output and a very substantial decrease in labor input. Mining and communications also registered good productivity performance mainly by decreasing labor input substantially. These industries are exceptions to a more typical pattern of productivity improvement resulting from a good increase in output in response to the cyclical recovery and a smaller but positive change in labor input. Farming shows the opposite characteristics, output was down and labor input up, thus giving a double-barreled attack on farming's productivity level.

Within the *manufacturing segment* (Figure 10) the patterns *varied widely* also. The highest levels of labor productivity in manufacturing are tobacco, petroleum and chemicals, all highly automated industries. At the other extreme, leather, furniture and apparel remained very labor intensive. It is an interesting curiosity that labor productivity of the tobacco industry was 5.8 times that of the leather, but it should not be inferred, as some analyses do, that tobacco is "better" than leather. Obviously, the automation of the tobacco industry cost a great deal of capital investment and generated a heavier exposure to business cycle effects.

In a free enterprise economy, the ultimate test remains high and growing return on assets over the long term. But *productivity improvement* is a key contributor to that *profit performance*. The four most labor-intensive segments of the manufacturing industries attacked the recession

Figure 9
Labor Productivity Level for Major Segments -- 1982 vs. 1983

	1982	1983	% Change	Changes in Output	Changes in Labor
Real Estate	$ 28.86	$ 26.71	−7.5%	−	+ +
Communications	19.62	21.58	10.0	+	−
Public Utilities	18.73	19.07	1.8	+	+
Manufacturing	8.66	9.03	4.3	+	+
Rail Transportation	8.40	9.42	12.1	−	−
Mining	8.25	9.04	9.6	−	−
Finance & Insurance	7.71	7.71	0.0	+	+
Private Business Economy	**7.61**	**7.82**	**2.7**		
Non-Rail Transportation	7.13	7.35	3.1	+	+
Trade	6.54	6.91	5.6	+	+
Farming	5.93	4.89	−17.5	−	+
Business Services	5.34	5.60	4.9	+ +	+
Contract Construction	5.16	5.12	−0.8	+	+

Source: American Productivity Center

Figure 10
Labor Productivity Level for Mfg. Industries — 1982 vs.1983

	1982	1983	% Change	Changes in Output	Changes in Labor
Tobacco	$29.48	$28.25	−4.2%	−	−
Petroleum	17.20	17.76	3.2	−	−
Chemicals	12.29	13.29	8.1	+	−
Food	9.99	10.02	0.3	−	−
Electrical Machinery	9.82	10.02	2.0	+	+
Trans. Equipment	9.49	10.60	11.7	+ +	+
Non-Elec. Machinery	9.07	9.36	3.2	−	−
Instruments	8.89	9.20	3.5	+	−
Paper	8.83	10.01	13.4	+ +	+
Manufacturing	**8.62**	**9.15**	**6.1**		
Primary Metals	8.06	8.92	10.7	+	−
Rubber	7.96	8.17	2.6	+ +	+
Fabricated Metals	7.44	7.98	7.2	+	−
Stone, Clay & Glass	7.17	7.77	8.4	+ +	+
Lumber	6.97	6.85	−1.7	+ +	+ +
Textiles	6.95	7.23	4.0	+ +	+
Printing & Publishing	6.78	6.96	2.6	+	+
Misc. Manufacturing	6.55	6.46	−1.4	−	+
Furniture	5.64	5.67	0.5	+ +	+ +
Apparel	5.42	5.62	3.7	+	+
Leather	4.79	4.86	1.5	−	−

Source: American Productivity Center

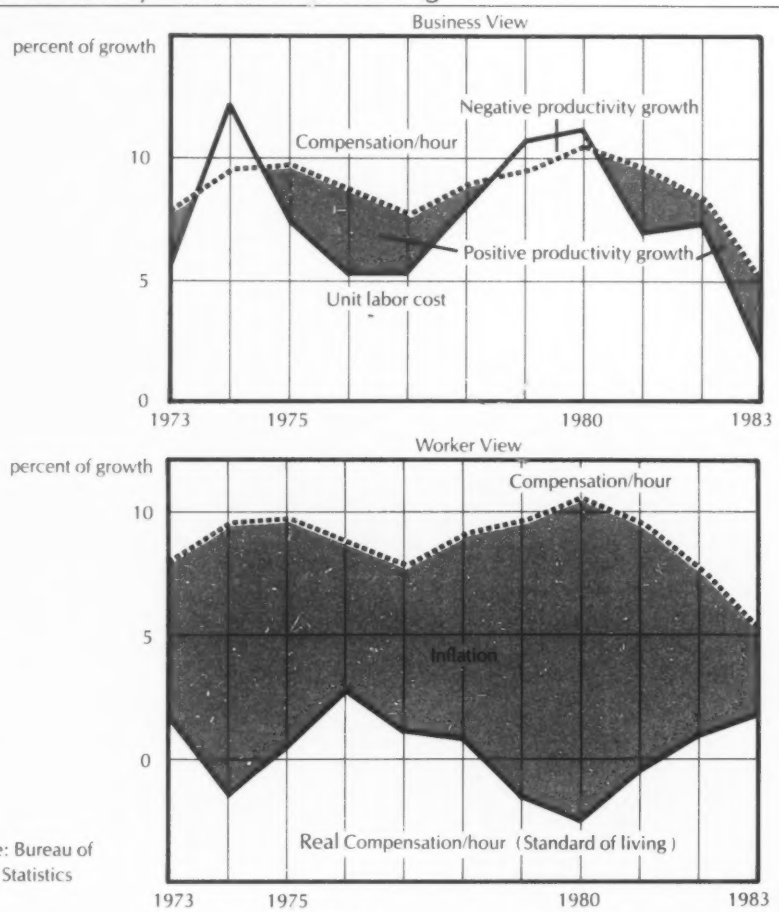
with decreases in labor force with varying results. In the case of chemicals, the decrease in labor input was accompanied by an increase in output. Other decreases in labor input were found in non-electric machinery, instruments, primary and fabricated metals and leather. Paper and transport equipment made the largest 1983 productivity increases because small increases in labor input were more than offset by strong increases in output. Declines in productivity were posted in tobacco, lumber and miscellaneous manufacturing. In the case of lumber, a strong output increase was covered by an even sharper increase in labor input. In the other two industries, weak output recovery was the main factor.

Interpretation of U.S. Performance

The overwhelming importance of productivity as an economic variable in its own right is demonstrated in Figure 11. One of the most important factors that a business must work with is unit labor cost, and possibly the most important economic figure for the average worker is real compensation per hour. Both of these are directly and immediately impacted by productivity performance. Figure 11 shows the relationships clearly. *Compensation* increases over the last nine years have been quite *stable*, ranging from seven to ten percent, depending on the time period. But during that period, *labor productivity* performance has *varied significantly*.

In 1975-1977, for example, output per hour increased at a rate of 2.7 percent per year whereas in 1978-1980 it declined 0.4 percent per year. The seemingly stable levels of increase in compensation per hour look startlingly different when expressed as levels of unit labor cost increase, since compensation per hour is mitigated by productivity improvement as it filters down to unit labor cost increase. *Thus unit labor cost increases were less than six percent in the first period but almost 10 percent in the second period.* (When compared to previous periods, even a six percent increase in unit labor costs is on the high side.)

Figure 11
Productivity and Standard of Living



Source: Bureau of Labor Statistics

	1975-77	1978-80	1981-83
Compensation/hour	8.6%	9.5%	7.5%
Output/hour	2.7	−0.4	1.7
Unit labor cost	5.9%	9.9%	5.8%
Inflation (CPI)	7.1	10.8	6.6
Compensation/hour	8.6	9.5	7.5
Standard of living	1.4	−1.1	0.9

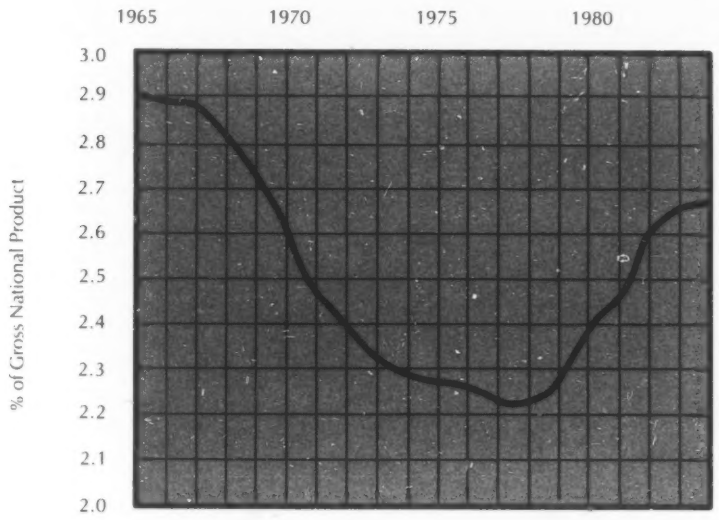
Although by no means the only contributor, the increase in *unit labor cost* is a major contributing factor to *inflation*. It should be noted that the level of unit labor cost increase is normally within a percent or so of the level of Consumer Price Index increase, since a great many pricing decisions of companies are made based on the unit labor cost increase that they have experienced.

From the point of view of the worker, gross *compensation per hour* increases are *offset by* the amount of *inflation* in the things that they are buying. So the rather steady compensation increases during the last nine years caused small *standard of living* increases in 1975-1977 and in 1981-1983. The disastrous years of 1978-80 showed an actual decline in real compensation per hour at an average annual rate of -1.1 percent in that three year period. That is the completely factual basis for warnings made during 1978-80 that the present generation runs the risk of being the first U.S. generation to leave a *lower* standard of living for its children. Fortunately, we have now seen some recovery.

Capital Investment

The key role of productivity is obvious, but the question of what influences the level of productivity is more multi-faceted. Certainly one notable factor is increases in the level of *capital investment*. It can be demonstrated that the highest long term performers in labor productivity improvement are usually those that have received healthy amounts of capital investment. The relationship, however, is not automatic. Unwise capital investment, or even capital investment that may eventually be "wise" but does not have an immediate impact, will hurt immediate productivity statistics. There is also the circular question of whether high-potential industries get the capital and as a result can "afford" to increase productivity, or whether already increasing productivity attracts the capital that allows industries to grow even more.

Figure 12
U.S. Research & Development — 1965-1984*



*1983, 1984 estimated

Source: National Science Foundation

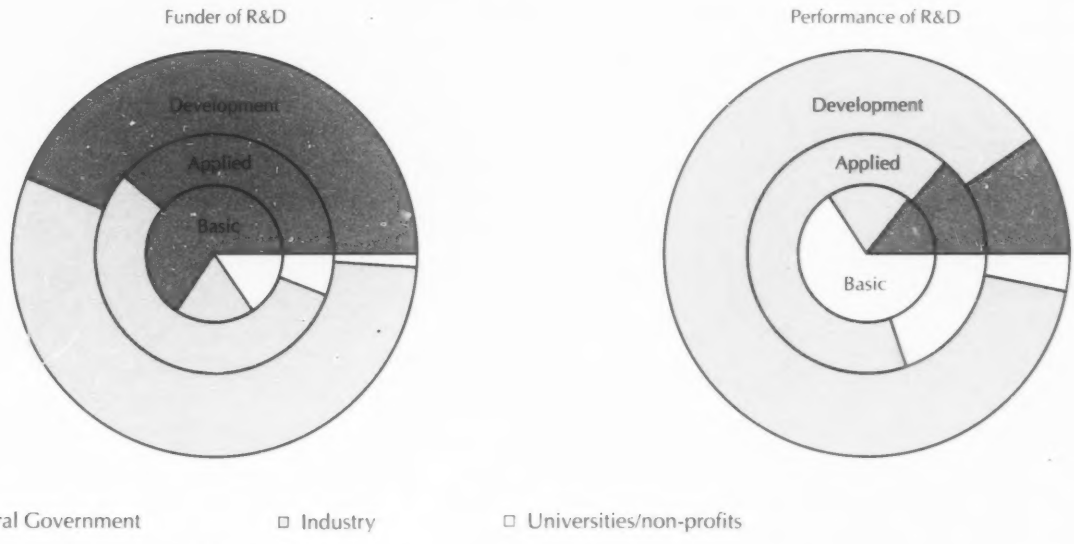
Research and Development

Another important variable in productivity growth is *research and development*, although the effect is likely to lag substantially. Improvement in research and development *now* will be reflected later as productivity improvement. During the last decade there has been a strong recovery in the U.S. percent of gross national product devoted to research and development (Figure 12).

Of particular interest are the *sources of funding* of research and development projects and *performance* of research and development projects (Figure 13). Most research and development is now underway in the development and applied categories. Industry is the largest funder of research and development, but the federal government is still a major funder, especially in basic research. In terms of who performs the research and development, the federal government takes a much smaller role. Industry is dominant in all of the categories except basic research where universities and non-profit organizations are in the lead.

These relationships have changed since 1960 (Figure 14). In the question of who funds research, there is noticeable slippage in the federal government's

Figure 13
U.S. Research & Development Performance — 1984



Source: National Science Foundation

Figure 14
U.S. Research & Development — 1960 & 1984

	% of R&D		
Funder	**1960**	**1984**	**%Change**
Federal, Basic	5.3	8.0	2.7
Applied & Dev.	59.3	37.7	−21.6
Industry, Basic	2.5	2.3	− 0.2
Applied & Dev.	30.9	48.6	17.7
Univ./Non-Profit, Basic	1.0	1.9	0.9
Applied & Dev.	1.0	1.5	0.5
	100.00	100.00	
Performer			
Federal, Basic	1.2	1.8	0.6
Applied & Dev.	11.6	9.3	− 2.3
Industry, Basic	2.8	2.4	− 0.4
Applied & Dev.	74.9	71.9	3.0
Univ./Non-Profit, Basic	4.9	8.0	3.1
Applied & Dev.	4.6	6.6	2.0
	100.00	100.00	

role in funding applied and developmental research. That slack has largely been taken up by industry. The federal government has, however, increased its contribution to basic research.

These shifts are also significant among the performers of R&D. Both federal government and non-profits have increased their roles in basic research. Though it is still small, there is an interesting increase in the percentage of applied and developmental research performed by universities and non-profits.

Economic Cycles

Those would appear to be the emerging R&D trends, but many long range capital investment and research plans are vulnerable to *economic business cycle* considerations in the short term. Of current concern in the area of capital investment and interest rates is the question of whether the current federal deficit will squeeze out corporate borrowing capability. The U.S. is still at a very high level of borrowing

relative to gross national product (GNP) (Figure 15). Recent history has shown an 18 percent peak in borrowing as a percent of GNP, and the latest statistics show that we are approaching that peak. Federal borrowing patterns can shift quickly.

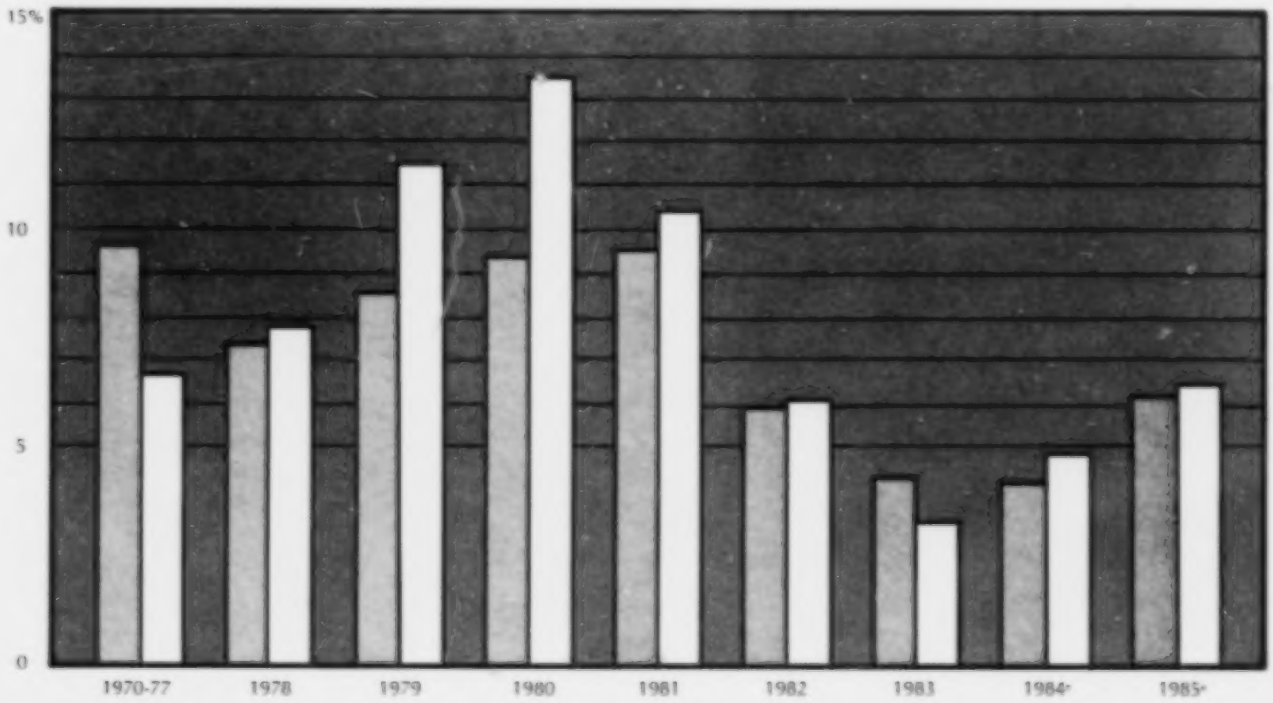
The effects of inflation are both direct and indirect. Certainly, unpredictable and sudden changes in inflation can be very disruptive to the economy. But even when inflation is behaving

Figure 15
Financing Economic Output (Borrowing as % of GNP)

	Private	+	Federal	=	Total
1973-I (recovery peak)	16%		2%		18%
1975-I (recession valley)	7		4		11
1977-II (recovery peak)	14		4		18
1982-I (recession valley)	8		3		11
1984-I (recovery in progress)	12		5		17

Source: Goldman Sachs

Figure 16
U.S. General Inflation Rates



e = Goldman Sachs estimates
Source: U. S. Department of Commerce

disruptive to the economy. But even when inflation is behaving in a fairly predictable fashion, the statistics can lead to confusion because *inflation indexes* are rarely understood.

The two leading indicators of "general inflation," are the GNP Implicit Deflator and the CPI (Figure 16). They have shown very different performance over the recent past, and care must be taken as to which is used and for what purpose. Figure 17 demon-

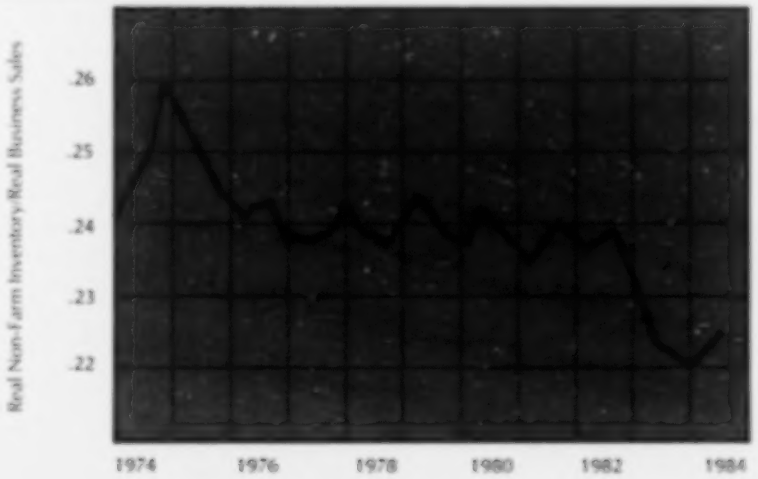
strates specific inflation indices as components of the CPI and further illustrates the wide range of inflation performance at any given time. Though all inflation rates have wound down dramatically in the last few years, the rate for medical care, for example, was still at 8.7 percent in 1983. General estimates are that there will be some slight increase in inflation in 1985, but that compared to the recent past, it will still be quite within control.

Figure 17
Specific Inflation (Annual Percent Increase)

	1979	1980	1981	1982	1983
CPI, Total	11.3%	3.5%	10.4%	0.1%	3.2%
Commodities					
Food	10.9	8.6	7.9	4.0	2.1
Energy	25.2	30.9	13.5	1.5	0.8
All Others	11.7	13.8	8.6	4.0	3.2
Services					
Medical Care	9.7	11.3	10.7	11.9	8.7
All Others	11.2	15.9	13.4	8.7	2.9

Source: Economic Report of the President

Figure 18
Real Non-Farm Inventory



Source: U.S. Department of Commerce

Business Factors

One variable in the productivity puzzle where performance has improved recently is *inventory size*. Figure 18 shows real non-farm inventory as a percent of real business sales, and the ratio, which had been a plateau at approximately .24, *has declined* in the last two years to almost .22. That is an important improvement that finds its way to the bottom line of companies that succeed in lowering inventory consistently.

Many feel that one important way of increasing productivity in many firms is the use of *incentive plans*. A recent survey helps quantify the importance of incentive plans in American industry. Fifty-nine percent of production workers in the United States are covered by some kind of incentive plan (Figure 19). Though experts may differ on exactly what is an incentive plan, based on the survey conductor's definitions, 38 percent of production workers were involved in some kind of individual plan such as piece work or bonuses related to performances against a standard.

Figure 19
Use of Incentive Plans

	% of Production Workers Covered*
Some incentive plan	59%
Personal Plans	**38**
Piecework	17
Bonus related to norms	23
Attendance, etc.	1
Group Plans	**33**
Profit sharing	12
Stock purchase	7
Bonus related to aggregative indicator	14
Shared savings, productivity increase	3

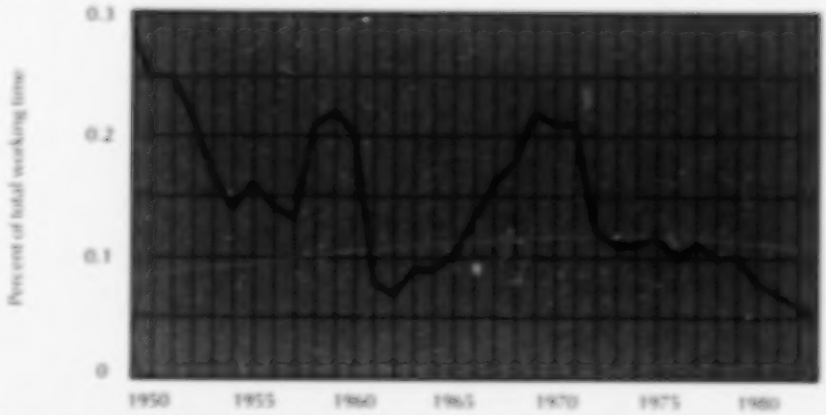
* Multiple responses possible; many workers covered by more than one incentive
Source: F. L. Pryor, *Monthly Labor Review* (July 1984, p. 40-43)

Thirty-three percent were involved in some kind of group plan such as profit sharing, bonuses based on an aggregate indicator or some other kind of plan. Though such plans are not appropriate everywhere, it is widely accepted that adoption of incentives in all levels and parts of the organization can lead to further productivity improvement.

It is commonly thought that work stoppages are a key factor influencing productivity statistics (Figure 20). The reason that an economy may look poor at any given time, goes the common wisdom, is that strikes have taken place. However, work stoppages in the United States have a relatively *small and declining direct effect*. Even at their peak in the late '40s, the number of workers idle due to strikes never exceeded 0.3 percent of the work force or 1 in 300 workers. An average level between 0.2 percent and 0.3 percent in the early '50s has now fallen to less than 0.1 percent in the late '70s and early '80s.

A recent report of the New York Stock Exchange has listed reasons for optimism on productivity for the years 1982-1995 (Figure 21). The study essentially concludes that many of the apparent problems that are seen with the American workplace aren't all that bad and that labor productivity should improve at a rate of 2.0 to 2.5 percent over the long run. Some of the reasons for this optimism relate to government policy and tend to extrapolate expectations that current political trends will be continued. Others relate to demographics and business management practices that are essentially outside or at least not directly related to government policy. But even these optimists admit that a major stumbling block may remain: the effect of the federal deficit on private sector investment.

Figure 20
Work Stoppages* — 1949-1983



* Days idle due to work stoppages as a percent of total estimated working time, moving three-year average

Source: Bureau of Labor Statistics

Figure 21
Reasons for Productivity Optimism — 1982-95

- U. S. policy emphasizing stimulating output rather than redistribution
- Tax policies to stimulate savings and investment
- Favorable demographics
- Improved energy productivity
- More R&D emphasis
- Greater flow of venture capital
- Controlled inflation
- Better human resource management

Factor undermining growth potential:

- Federal deficit preempting private sector investment

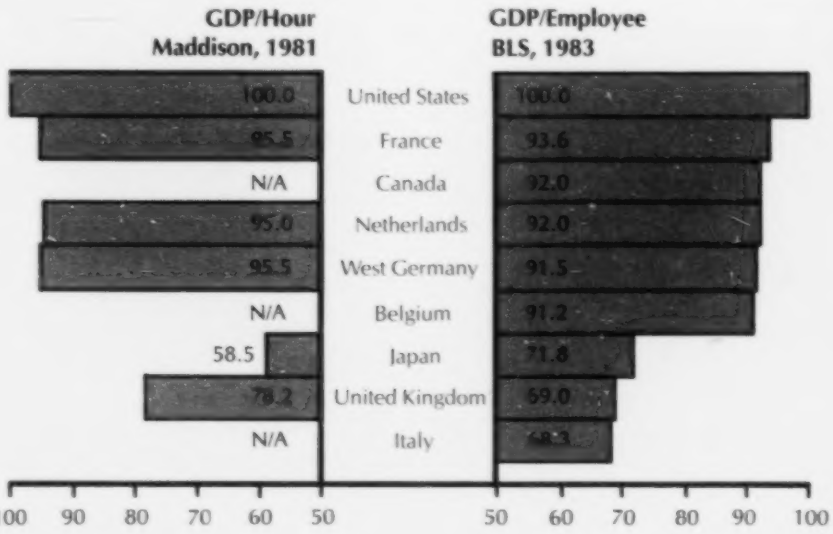
Source: New York Stock Exchange

Asia, Europe and the U.S.

Very few consistent statistics are available to compare productivity growth rates and levels among nations. Two alternative approaches are presented in Figures 22 and 23; these offer a fairly clear picture of relative performance among those countries that are represented. In many respects the preferable approach is the ratio based on gross domestic product (GDP) per hour. This is a more fundamental measure than gross domestic product *per employee*, but it is obviously easier to count employees than to count hours. Since employees in different countries work substantially different numbers of hours, the two approaches can yield quite different results. These differences are less obvious in Figure 23, which is productivity trend, than in Figure 22, which is productivity level.

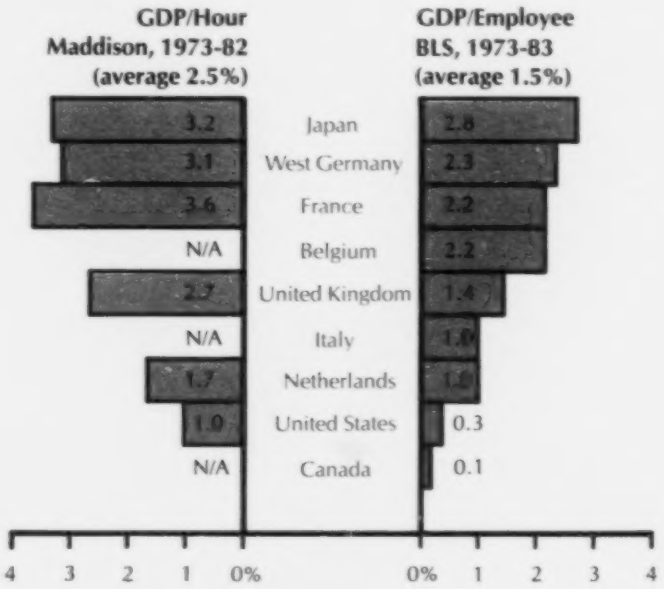
The United States is still the world leader in the *level of productivity*. However, that lead is in part a function of the way in which the various gross domestic products are translated into dollars for comparison with the United States. In Figure 22, both GDP/employee and GDP/hour show that France is definitely a leading competitor in productivity level and that West Germany, Netherlands, Canada and Belgium are also close. Japanese performance depends heavily on whether the input factor of the ratio is hours or employees, since the Japanese work substantially longer hours. The United Kingdom, by contrast, fares better with a GDP per employee ratio, since its workers put in shorter hours than those in the United States.

Figure 22
International Productivity Levels



Source: Angus Maddison; Bureau of Labor Statistics

Figure 23
International Productivity Growth



Source: Angus Maddison; Bureau of Labor Statistics

The growth rate comparisons show different results (Figure 23). There is no doubt that Japan is still the leader in *productivity growth*, even though the whole world has seen a falling off from earlier higher growth rates. West Germany and France also show up as leading performers. On the "per hour" calculation, France's rate in the last decade is higher than that of Japan. In either case, the United States brings up the rear.

When the comparisons are restricted to *manufacturing productivity growth*, the recent performance of the United States is quite encouraging (Figure 24). For the 1980-1983 period, the United States was in the middle of the pack rather than at the bottom; Japan was still leading in that period. Another country unaccustomed to the front ranks is the United Kingdom, which registered with a remarkably strong 5.2 percent improvement in manufacturing labor productivity during this period. The unfortunate fact is that much of this increase came from decreases in the labor force rather than increases in output. West German performance is surprisingly low given its history of competing for European productivity improvement leadership with France.

Figure 25 reminds us that the world productivity growth leaders are not among the largest industrial nations. Many countries in *East Asia* have higher productivity performance improvement rates than either Japan or the United States. Unfortunately, the statistics are even more sparse in that part of the world, but the average growth in GNP per capita in the four countries indicated (Hong Kong, Singapore, South Korea and Taiwan) is in the six to eight percent range. Typically, these countries are thought of as sufficiently underdeveloped so that productivity improvement is "easy," but the GNP per capita in Singapore is now only about 25 percent below that of Japan.

In manufacturing output growth these countries are at or near double digit performance for the whole decade of the '70s compared to 6.4 percent in Japan and 2.9 percent in the U.S. Furthermore, manufacturing accounts for a higher percent of GNP in these countries than in the U.S. A major determinant of manufacturing growth is the availability of a manufacturing labor force; population expectations for the Asian countries show a sufficient growth in labor force to more than sustain this improvement rate if other economic and political conditions hold constant.

Figure 24
International Manufacturing Labor Productivity

	1973 - 80	1980 - 83
	(average annual percent growth)	
Japan	7.0%	6.6%
Belgium	6.1	5.5*
United Kingdom	1.2	5.2
France	4.6	4.7
United States	**1.3**	**3.6**
Sweden	2.5	3.2
Netherlands	5.2	3.1*
West Germany	4.0	3.1
Canada	1.6	2.3
Italy	3.7	2.2
Norway	2.1	2.1

* 1980-82
Source: Bureau of Labor Statistics

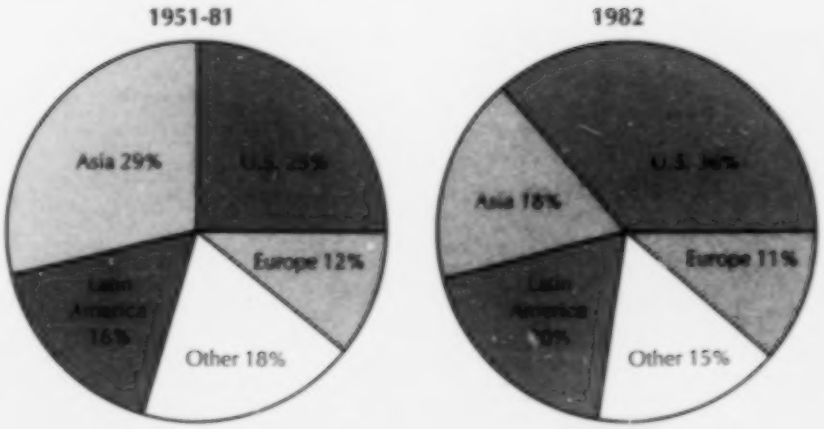
Figure 25
Comparative Growth Factors — East Asia and United States

	Hong Kong	Singapore	South Korea	Taiwan	Japan	U.S.
GNP/Capita						
Average Growth, 1960-80	6.8%	7.5%	7.0%	7.7%	7.1%	2.3%
$US Level, 1982	$5,270	$6,600	$1,740	$2,640	$8,860	$13,180
Manufacturing Output						
Average Growth, 1970-80	9.3%	9.6%	16.6%	13.4%	6.4%	2.9%
% of GNP, 1980	27%	28%	28%	N/A	29%	24%
Labor Force						
Expected Average Growth, 1980-2000	1.3%	1.4%	2.0%	N/A	0.7%	0.9%

Sources: World Bank, Republic of China Monthly Bulletin of Statistics, Asian Development Bank

Though Japan has slowed from its performance of the '60s and early '70s, it is still the growth leader in productivity. Japan's orientation has shifted as it has become a bit more mature manufacturer and marketer. One interesting change is in overseas investment tendencies (Figure 26). Overseas investments made by Japan during the 30 years from 1951 to 1981 show a predominance of investment in other Asian countries and a secondary interest in the United States. In contrast, the 1982 pattern shows that the percentage invested in the remainder of Asia has declined from a 29 percent average to 18 percent and that slack was exactly taken up by its increased investment in the U.S.

Figure 26
Japan's Direct Overseas Investment

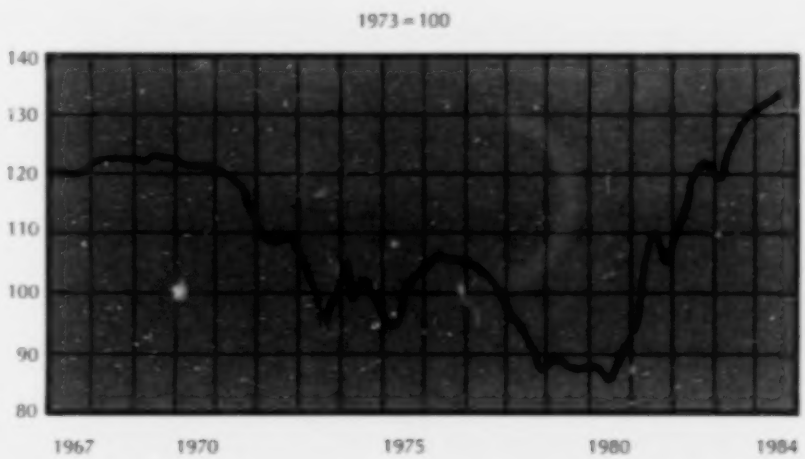


Source: Japan Finance Ministry

World Trade

One of the most difficult economic indicators to interpret is that of world trade. The United States showed unprecedentedly high *trade deficits* in 1983 and on into 1984. The conventional economic wisdom is that persistent trade deficits are at least a danger sign (or worse), but the strength of the dollar has severely inhibited exports in many industries. Also, there seems to be an inconsistency between weak U.S. productivity performance and strength of the dollar. Nevertheless, the U.S. has become much more of a haven for world investors. That influx of investment money has in effect "financed" the bad merchandise trade imbalances for the United States and helped provide relief from the long-anticipated scramble for funds caused by federal deficits. There is no doubt that the trade balance statistics are important; but whether they are to be a harbinger of strength or weakness is yet to be decided.

Figure 27
U.S. Dollar Trade-Weighted Exchange Rate



Source: U. S. Department of Commerce

Figure 27 shows that the U.S. *trade weighted exchange rate* reached records in the recent past and continues to show strength even though most observers assume that this persistent improvement cannot continue indefinitely. The trade deficits for 1983 show that the United States has reached a point where the level of exports

is only 78 percent of imports, the worst percentage among all of the leading trade nations (Figure 28). Japan, Canada and West Germany show positive trade balances.

A little more investigation into the export detail shows that in the last 20 years, Japan has been the insurgent in manufacturing exports, but its most recent success has been at the expense of Europe rather than to the detriment of the United States (Figure 29). In the last 10 years Japan's two percent improvement and the "rest of the world's" three percent improvement have both come at the expense of the European Economic Community countries, which have declined a startling five percent in their share of world manufacturing exports.

A New York Stock Exchange study has translated foreign trade imbalances into jobs "created" or "destroyed" in the U.S (Figure 30). The greatest "job loss" has been in four major industries — apparel and household textiles, motor vehicles, shoes and

Figure 29
Share of Manufacturing Exports

	U.S.	Japan	EEC*	Rest of World
1962	15%	6%	45%	34%
1972	12	10	46	32
1982	12	12	41	35

*Belgium, France, Italy, West Germany, Netherlands, U.K.
Source: New York Stock Exchange

Figure 30
Jobs and Foreign Trade — 1982

	Jobs (000)	
Industry	**Created**	**Destroyed**
Computers	135	
Aerospace	122	
Construction, Mining & Oilfield Equipment	103	
All Other Industries	**165**	**461**
Ferrous Metals		137
Shoes & Leather		142
Motor Vehicles		161
Apparel & Household Textiles		208

Source: New York Stock Exchange

Figure 28
International Balance of Trade — 1983

$ Billions		
Exports (FOB)		Imports (CIF)
$200.0	United States	$258.0
91.2	France	105.0
168.8	W. Germany	152.0
72.8	Italy	80.3
65.4	Netherlands	61.4
91.8	United Kingdom	100.1
147.0	Japan	126.5
71.8	Canada	62.3

Source: Organization for Economic Cooperation and Development

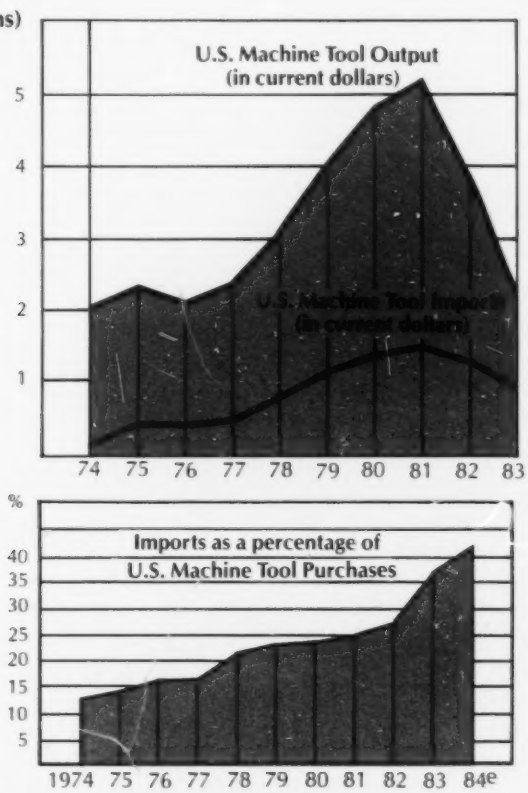
leather and ferrous metals. The NYSE asserts that if it were not for these four special industries, U.S. foreign trade would be a net job creator. But that is ignoring the other side of the coin, which says that if it weren't for three major creators of jobs (computers, aerospace and construction, mining and oil field equipment), the balance would be phenomenally worse.

The real emphasis should be on U.S. *domestic policies* (of government, unions and business alike) to lubricate the flow of the work force to "export advantaged" industries from "export-disadvantaged" industries. The evidence of Figure 30 presents either a serious problem or merely normal long term expectation for a nation, depending on whether regulatory, work rule, social and corporate strategic planning rigidities persist or not.

Figure 31 puts one element of world trade, the machine tool industry, under the microscope for a closer look. U.S. performance has not been good at all. Machine tools are the building blocks of manufacturing performance, and it is particularly embarrassing that the U.S. loses share in an industry that it has historically dominated. Machine tool output decreased substantially in the United States in 1981-83, and imports as a percent of machine tool purchases jumped from less than 15 percent 10 years ago to more than 35 percent today. The estimate for 1984 is that 42 percent of machine tool purchases will be imported machine tools.

Behind the trade imbalances are some specific stories of both success and failure (Figure 32). For

Figure 31
Machine Tool Trends



Source: National Machine Tool Builders Association

Figure 32
Net Exports in Selected High-Technology Industries – 1970 & 1980

(Millions of 1980 dollars)

	Medicinal & pharmaceut. products		Artificial Resins and plastic materials		Electrical machinery		Professional, scientific & controlling instruments	
	1970	1980	1970	1980	1970	1980	1970	1980
France	148.5	796.3	−62.2	33.2	272.5	664.0	−72.9	−56.0
West Germany	546.1	981.4	1,573.5	2,590.0	2,914.2	4,480.1	1,094.9	1,573.0
Japan	−259.8	−779 5	1,092.0	1,315.1	3,638.1	7,230.1	907.6	562.5
United Kingdom	439.6	1,217.1	243.3	261.3	1,076.3	655.0	304.9	476.5
United States	575.0	1,216.9	1,635.5	3,171 1	1,378.8	169.8	966.0	3,712.7

Sources: Organization for Economic Cooperation and Development and Council ofEconomic Advisers.

example, U.S. exports in medical and pharmaceutical products, artificial resins and plastics, and professional scientific and controlling instruments have improved very nicely. But electrical machinery exports have almost dried up. Japan has shown strong increases in electrical machinery but serious declines in medical and pharmaceutical products and professional scientific and controlling instruments. This table presents the theory of comparative advantage at its best.

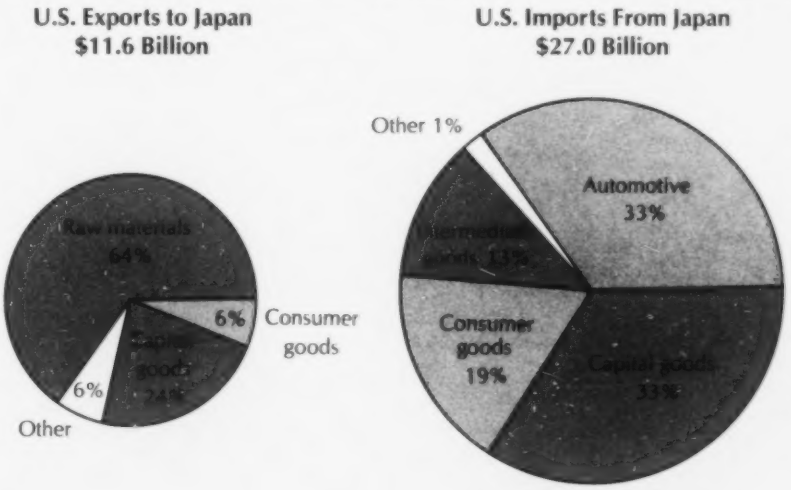
In looking at the U.S. trade imbalance, it is particularly interesting to note the nature of the U.S. and Japan trade (Figure 33). For the period January-June 1984, the Japan-to-U.S. flow is more than twice the U.S.-to-Japan flow. What is particularly interesting is the nature of the flows. The U.S. is sending to Japan essentially raw materials. The U.S. is importing from Japan no raw materials. Japan is sending finished goods to the United States. This is a classic "colonial pattern," but in reverse from what the United States is accustomed to.

World Growth

World performance as marked by *key indicators* of economic growth, inflation and unemployment during 1983 was mixed (Figure 34). The United States showed good performance in 1983 according to these indicators. U.S. GNP growth was higher than in its recent history and higher than the OECD average, inflation was lower than U.S. experience and lower than OECD average, and unemployment only slightly higher than the OECD average. As usual Japan's performance was superlative on all three.

The magnitude of growth problems in Europe is evident in the very low rates of growth in West Germany, France, Italy, Belgium, Switzerland and the Netherlands. Some inflation rates seem high, but in virtually all cases each nation's 1983 inflation was lower than its '72-'82 average. Particularly notable is the United

Figure 33
U.S. and Japan Trade — January-June, 1984



Source: Japan Economic Institute

Figure 34
World Economic Factors

	GNP Growth		Inflation		Unemployment
	Avg. 72-82	1983	Avg. 72-82	1983	1983
United States	2.2	3.4	7.6	3.9	9.6
West Germany	2.0	1.3	5.2	3.0	8.2
France	2.7	0.7	10.6	9.6	8.4
United Kingdom	1.4	3.1	13.7	5.4	11.6
Italy	2.6	−1.2	17.1	14.9	9.7
Canada	2.8	3.0	9.5	5.9	11.9
Netherlands	1.9	1.0	7.3	2.5	14.2
Spain	2.6	2.3	16.5	12.1	17.9
Australia	2.6	1.2	11.3	9.4	9.9
Belgium	2.3	0.5	7.6	7.7	14.0
Sweden	1.6	2.3	10.4	10.6	3.5
Switzerland	0.5	−0.1	5.0	3.0	0.9
OECD Total	**2.5**	**2.4**	**8.7**	**5.5**	**8.9**

Source: Organization for Economic Cooperation and Development

Figure 35
Comparative R&D as Percent of GNP

	Average Annual Ratio		
	1961-65	1971-75	1981
USSR	2.7%	3.6%	3.5%
West Germany	1.5	2.3	2.7
Japan	1.4	1.9	2.4
United States	2.8	2.4	2.4
United Kingdom	2.4	2.1	2.2*
France	1.6	1.8	2.0

Source: National Science Foundation

* estimate

Figure 36
International Savings and Investment — 1983

	Savings as % of Disposable Personal Income	Capital Formation as % of GNP
United States	5.0%	16.7%
France	15.5*	19.8
West Germany	12.7	20.6
Italy	24.0*	[illegible]
Netherlands	14.8*	18.1
United Kingdom	8.5	15.2
Japan	17.7*	28.4
Canada	13.3	19.9

* 1982 data

Source: U. S. Department of Commerce

Figure 37
Government Share of Economy — 1981

	Current government receipts as % of GNP
Sweden	59.0%
Netherlands	55.9
Norway	52.5
France	46.1
West Germany	44.6
Belgium	44.0
United Kingdom	43.4
Italy	38.7
Canada	38.7
United States	33.7
Japan	29.3

Source: Organization for Economic Cooperation and Development

Kingdom's 5.4 percent inflation compared to an average of 13.7 percent in the last decade. It is a little unusual to see the United States, the United Kingdom and Canada all vying with Japan for leadership in GNP growth.

Comparative *research and development* statistics are given in Figure 35. The United States performance shows a slippage from its ratio of 20 years ago; but 1983-84 statistics show the U.S. has subsequently returned to nearly a 2.7 percent level. West Germany, Japan and France have shown good increases over time. The United Kingdom shows a pattern similar to that of the United States. The highest level of R&D as a percent of GNP is still the Soviet Union, but statistics on the Soviet Union are always subject to speculation.

International *savings and investment* show that the United States is still at a very low level of savings compared to other countries (Figure 36). Japan is the leader in capital formation and also (except for Italy) the leader in savings as a percent of disposable income.

It is sometimes useful to put in perspective the effect of the *government* on the economy. It is not uncommon for U.S. citizens to complain about the large impact of government on their lives and pocketbooks, yet the United States is *next to last* in the list of major countries when government direct impact is analyzed (Figure 37). In Sweden, 59 percent of GDP is received by the government whereas only 33.7 percent of GDP is received by the government in the United States. What the government proceeds to do with the money and what services are subsequently available for that money

are other issues, but the gross impact of the government on the economy is less in the United States than in any of the countries of Europe.

The historical *hours-worked* pattern also gives a sense of perspective (Figure 38). In 1929 all the major countries of the world had very similar working hour patterns, between nine and nine and a half hours per employee per day. Since then, the patterns have changed dramatically. All have fallen off from that level by 25 to 35 percent except Japan which has only fallen off about 10 percent. But the fall-offs occurred at different times in history. West Germany was working longer hours in 1950 than in 1929, whereas France, United Kingdom and U.S. had already fallen off 20 percent. But between 1950 and 1973 West Germany fell off enough to catch up with the rest of the world in shortening hours, although France and Germany are still approximately 10 percent higher than the United Kingdom and 5 percent higher than the United States.

Figure 38
Hours Worked per Employed Person per Year

	France	West Germany	Japan	United Kingdom	United States
1929	2297	2284	2364	2286	2342
1950	1989	2316	228	1958	1867
1973	1825	1827	2213	1688	1687
1981	1701	1681	2140	1503	1582

Source: Angus Maddison

It is impossible to convey the true scope of international competition in a small chart book, but it is certainly clear that any claims by the United States of economic superiority face strong challenge from several nations around the world. The current problems are problems of the whole world. All countries have been hurt by recession and have a challenge of converting and sustaining the present recovery into something that can build more permanent structures. This is no time for complacency on the part of American decision makers; the need to compete is still there and time is passing.

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